CHAPTER 3

VEGETATED FILTER STRIPS

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DEFINITION

Vegetated filter strips are areas of land with natural or planted vegetation designed to receive sheet runoff from upgradient development. They may be or resemble various natural environments such as meadows or riparian forests. Their primary function is to remove soil particles and nutrients from overland sheet flow before it reaches a surface water. The primary removal mechanisms are sedimentation and infiltration as the flow moves through the strip.

EFFECTIVENESS

Vegetated filter strips are effective in removing sediment and sediment laden pollutants from urban stormwater. They are effective only for sheet flow and provide little removals for concentrated flow. The United States Environmental Protection Agency (1993) lists the following percent removals for vegetated filter strips:

Pollutant	TSS	TP	TN	COD	Pb	Zn	Factors
Average	65	40	40	40	45	60	Runoff vol
Reported Range	20 - 80	0 - 95	0 - 70	0 - 80	20 - 90	30 - 90	Buffer length
Probable Range	40 - 90	30 - 80	20 - 60	--	30 - 80	20 - 50	Slope Soil infil
No. Values	7	4	3	2	3	3	Veg cover

To work properly, a filter strip must be: 1) equipped with some sort of level spreading device; 2) densely vegetated with a mix of erosion resistant plant species that effectively bind the soil; 3) graded to a uniform, even, and flat slope; and 4) be at least as long as the contributing runoff area (Schueler, 1987). Vegetated strips with shrubs and trees may remove more pollutants than grassed strips, as shrubs and trees absorb and retain more nutrients. To be effective, filter strips must be large in relation to the area being drained, relatively flat, and have a relatively low groundwater level (United States Environmental Protection Agency Region 5, 1992). The State of Rhode Island recommends against considering home lawns as part of a buffer strip, as lawns receive high pedestrian traffic and are extensively groomed (Rhode Island Department of Environmental Management, 1993)

PLANNING CONSIDERATIONS

The most important planning considerations for a filter strip include: the amount of runoff directed onto the strip, the slope of the strip, the need to maintain sheet flow across the strip, and the soil types in the strip.

The Rhode Island Department of Environmental Management (1993) recommends the following:

(a) Individual filter strips should only serve contributing areas less than 5 acres to reduce the potential for concentrated and erosive stormwater flows.

(b) Filter strips should be located on slopes of 5% or less to enhance filtering and infiltration of stormwater runoff.

(c) Filter strips should have topsoil composed of loamy sands, sandy loams, loam, or silt loam. Other soils with higher percentages of fine materials (e.g., silty clay loam, or sandy clay) are poorly suited for filter strips due to very slow infiltration rates and therefore are not suitable.

And the United States Environmental Protection Agency (1993) lists the following advantages and disadvantages:

ADVANTAGES	DISADVANTAGES
-Low maintenance -Can be used as part of conveyance system -Reduce particle pollutant loads -Provides urban wildlife habitat -Economical	-Often concentrates water , if poorly constructed, reducing effectiveness -Variable ability to remove solubles -Limited feasibility in highly urbanized areas -Requires periodic maintenance and sediment removal

DESIGN CRITERIA

The filter strip should directly abut the impervious area or a level spreader should be constructed at the top of the strip to distribute the flow.

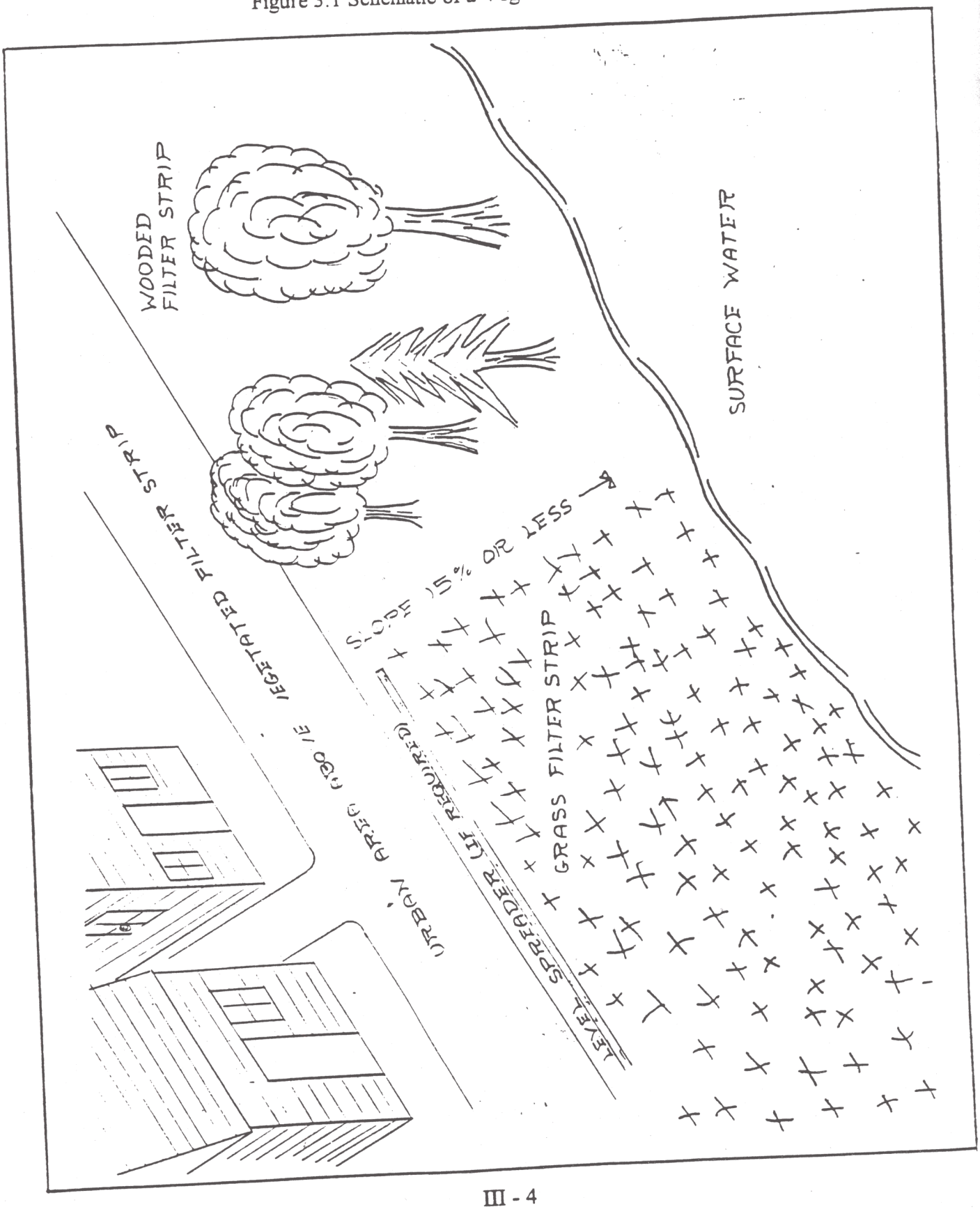
Wooded filter strips are preferred to grass strips. If an existing wooded strip does not exist, the grassed strip should be managed to allow woody vegetation to colonize the strip.

Flow to the filter strip should not exceed 0.5 cubic feet per second/foot of filter strip width.

Filter strip slope should not exceed 15 percent.

The minimum width of the filter strip should be 75 feet.

Figure 3.1 Schematic of a Vegetated Filter Strip



MAINTENANCE REQUIREMENTS

A properly designed and constructed filter strip should require little maintenance. It should be inspected frequently during the first year of operation and then annually thereafter. Large accumulations of sediments should be removed, and all gullies filled in and stabilized. Areas of bare soil should be immediately stabilized.

REFERENCES

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